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Managing Deer Damage in Nebraska

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Deer browse a variety of plants, especially when densities are high or forage is limited. This browsing can damage trees, plants, vines, and fruit. This guide discusses how to recognize, manage, and minimize deer damage.

Deer are the most plentiful and widely distributed large mammals in North America. White-tailed deer (*Odocoileus virginianus*, Figure 1) are found throughout Nebraska, while mule deer (*Odocoileus hemionus*, Figure 2) reside primarily in the western half of the state.



Figure 1. Adult male white-tailed deer (Photo by G. Clements).

The Nebraska Game and Parks Commission (NGPC), manages deer in Nebraska and estimates that the current population level is 300,000 to 350,000 deer.

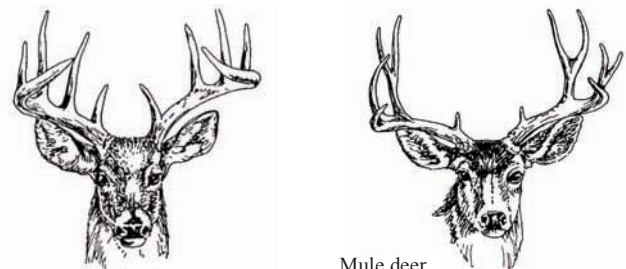
Identification and Ecology



Figure 2. Adult female mule deer (Photo by G. Clements).

White-tailed deer get their name from their broad tails that are entirely white underneath. Mule deer have small, thin, and black-tipped tails, and get their name from their large, mule-like ears. Fawns of both species have rust-colored coats with white spots but their coats turn grayish-brown after three to four months. During the summer, adult white-tailed deer have a white belly with a contrasting reddish-brown coat that changes to grayish-brown in the winter. Mule deer have a yellowish-brown coat during the summer that fades to gray in the winter. Mule deer also have a white rump patch surrounding their tails. When frightened, both species carry their tails upright. White-tailed deer flee with a smooth, graceful gallop while mule deer move in a sequence of stiff-legged jumps called “stotting,” where all four hooves hit the ground at the same time. Adult deer typically weigh 100 to 200 lbs.

Between late March and early September, male deer grow antlers. Deer antlers develop quickly; they can grow up to 1/2 inch per day during peak development. During the summer, the developing antlers are surrounded by a soft, vascularized layer known as “velvet.” Before the fall breeding season (rut), however, the velvet dries and bucks scrape it off on trees and shrubs. White-tailed bucks typically have tines that arise from single, curved beams while the antlers of a mule deer are often forked and appear to form the letter “Y” (Figure 3).



White-tailed deer

Mule deer

Figure 3. Antler configuration of adult male white-tailed deer and mule deer (Photo courtesy of ICWDM).

The breeding season lasts from October to January and peaks in early November. Adult doe litter sizes range from one to four young. Fawns 6 months of age or older are capable of breeding and producing one fawn in late spring. Does have a gestation period of 6 1/2 months and often give birth in late May and early June.

Deer are very adaptable and live in a variety of habitats. White-tailed deer flourish in agricultural areas with extensive cover and access to streamside habitat. Mule deer are generally found in pockets of habitat where the terrain is more open and steep. Both species frequent agricultural fields, such as alfalfa, corn, soybeans, and winter wheat.

Importance and Impacts

Although deer are one of the most valued wildlife resources in Nebraska they can damage a variety of resources including field crops, haystacks, specialty crops, gardens, nursery stock, and ornamentals, especially when numbers of deer in an area are high. Other significant damage can include reduction of product quality, loss of genetic stock, removal of critical plant species, and other long-term ecological impacts.

Deer-vehicle collisions. About 5,000 deer-vehicle collisions are reported each year in Nebraska and are of significant concern especially in areas with high densities of deer and high traffic volumes.



Figure 4. Tree branch damage caused by deer browsing (left) and rabbit browsing (right) (Photo by S. Vantassel).



Figure 5. Damage to a young tree caused by buck rubbing (Photocourtesy of ICWDM).



Figure 6. Deer track in the snow (Photo by G. Clements).

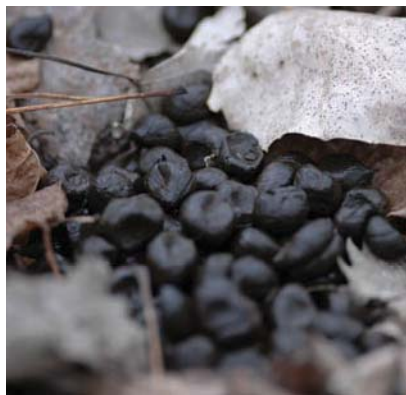


Figure 7. Deer pellet group (Photo by G. Clements).

Diseases. Deer can also transmit diseases to humans and other wildlife. For example, salmonella, giardia, and *E. coli* can be contracted when handling or processing deer. To reduce the risks of infection, avoid direct contact and wear protective equipment, such as disposable gloves.

Deer are also considered an important facilitator in the distribution of ticks that carry bacteria that cause Lyme disease. Avoid tick bites by wearing long-sleeved shirts and pants tucked into boots. Insect repellents with DEET can be applied to skin and clothes to help reduce the risk of tick bites.

Chronic wasting disease (CWD) is a degenerative, fatal disease that affects free-ranging and captive members of the deer family. Like Mad Cow Disease and scrapie, it is caused by rogue proteins called “prions.” Chronic wasting disease has been detected in about 0.5 percent of deer tested in Nebraska, nearly all of which have been in the Panhandle. More research is needed to understand the long term impacts CWD may have on populations of deer.

All research to date, has shown that humans cannot contract CWD. Hunters, however, can have their deer tested for CWD at hunter check stations or with home test kits. When processing deer, cut meat off of the bone rather than sawing through bone and sterilize knives with a 10 percent bleach solution after cutting.

Damage Identification

Browsing by deer is easily identified by the jagged or torn edges of twigs or stems (Figure 4). Most browsing occurs from

the ground up to six feet. In September, males start rubbing their antlers against trees, which can lead to girdled, severely damaged, and dead trees (Figure 5). Deer leave a distinctive heart-shaped track that can be identified from other mammals (Figure 6). In addition, deer often leave distinctive groups of droppings (pellets) that are about 3/4-inch long and slightly sausage-shaped, unlike rabbit droppings, that are perfectly spherical (Figure 7).

Damage Prevention and Control

Habitat Modification

Deer browse a variety of plants, especially when densities of deer are high or forage is limited. In some situations deer damage can be reduced by selecting plants with thorns, thick bark, or through application of chemical compounds that make them less attractive to deer. The Internet Center for Wildlife Damage Management (ICWDM) provides a list of these types of ornamental plants and their susceptibility to deer damage (http://icwmdm.org/handbook/mammals/mam_d25.pdf). No plant is entirely deer-proof, but selection of less attractive species may help to lower damage to a tolerable level.

Removing or altering deer habitat is not recommended, since it may negatively affect other wildlife and the environment. Harvest field crops and woody florals as soon as possible to reduce their vulnerability to deer. Lure crops such as clover, alfalfa, or corn that are planted to draw deer away from fields usually are not effective and may, in fact, contribute to higher densities of deer.

Exclusion

Fencing can be very effective in preventing and reducing damage by deer when resources require reliable protection. Several permanent and temporary fencing designs are available to meet specific landowner needs. The ICWDM (<http://icwmdm.org>) Web site provides a detailed manual on construction and maintenance of all fences mentioned in this NebGuide.

Permanent, high-tensile, woven-wire fences have been used for years to control deer damage and are considered the “gold standard” of fencing (Figure 8). They are the most expensive to build, but require little maintenance. Cost, excluding labor, is about \$4-6 per foot. They should be considered when either deer damage is excessive or if you are protecting particularly valuable resources such as orchards, nurseries, fruits, and truck crops. Woven-wire fences should be at least eight feet tall and have a lifespan of 20+ years.

High-tensile vertical electric fences provide a permanent, less expensive, yet effective alternative when deer pressure is moderate to high and have been found to be about 85 percent effective in reducing deer damage (Figure 9). They generally consist of six to seven strands of high-tensile wire spaced about one foot apart. Their unique design and the shocking from electricity present both a physical and psychological barrier to deer. Costs, excluding labor, range from \$2-4 per foot. Frequent inspection and maintenance are required to ensure the expected 20+ year life expectancy.

Poly-tape and poly-twine fences are temporary, portable electric fences effective for plots up to about 40 acres with moderate deer pressure (Figure 10). When baited with peanut butter, the fences lure deer into contact with their nose or mouth, and the shock teaches deer to avoid fenced areas. Poly-tape and poly-twine fences have a life expectancy of about 20 years, and should be removed at the end of each

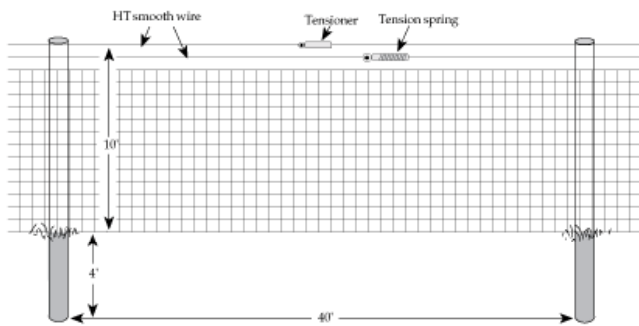


Figure 8. Recommended permanent, high-tensile woven-wire fence (Image courtesy of ICWDM).

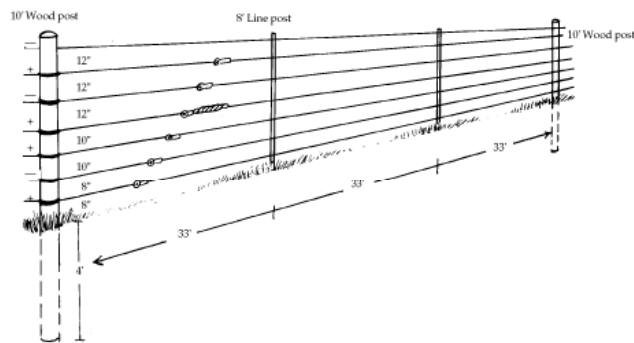


Figure 9. Recommended high-tensile vertical electric fence (Image courtesy of ICWDM).

growing season and stored indoors during the winter. Single or double-strand fences can be constructed for \$0.70 per foot, excluding labor. Higher quality poly-material fences can be used to protect larger areas for longer periods for \$4-6 per foot.

Exclusion options are also available for protecting individual trees, shrubs, and other plants against deer browsing and antler rubbing. Chicken wire, woven-wire, and degradable plastic netting vary in price and are available through many commercial vendors. Individual plastic cylinders and tubes are found in a variety of sizes and cost \$2-\$5 per tube (Figure 11).

Repellents

Due to high costs, limitations on use, and variable results, repellents are best suited for small areas such as orchards, gardens, and ornamental plantings. Some repellents are labor-intensive and require frequent reapplication, especially after rainfall. Measure the effectiveness of repellents by the reduction, not total elimination, of damage. Success in using repellents often depends on a variety of factors including the degree of habituation to the site, motivation of the animals, attractiveness of the plants, concentration of the repellent, and consistency in repellent application. Apply repellents when plants are either most susceptible or

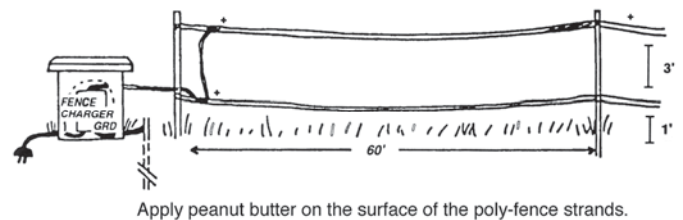


Figure 10. Recommended poly-tape or poly-twine peanut butter electric fence (Image courtesy of ICWDM).

at the first signs of damage to avert deer from developing a feeding pattern. Chemical repellents affect smell, taste, and pain receptors of deer and should be applied either directly on the plant or near the resource needing protection.

Studies have repeatedly shown that Deer-Away® Big Game Repellent is an effective repellent for reducing deer damage to trees, shrubs, and other woody vegetation. Deer-Away® consists of putrescent egg solids in either powder or liquid form, and is reported to be 85-100 percent effective. Applications generally weather well and are effective up to six months. One gallon of liquid or 1 lb of powder costs about \$32 and covers 400, 3-inch saplings.

Miller's Hot Sauce Animal Repellent®, which contains capsaicin (the active ingredient in salsa and mace), is reported to have excellent success when used in high concentrations. Weatherability can be improved by adding an anti-transpirant product such as Vapor Gard®. Miller's Hot Sauce® and Vapor Gard® cost about \$310 and \$55 per gallon concentrate, respectively. Eight ounces of Hot Sauce and two quarts of anti-transpirant mixed with 100 gallons of water will cover one acre. Use care, such as wearing rubber gloves, when applying capsaicin because it can cause severe irritation to the nose, eyes, and skin.

Other repellents such as Hinder® and Thiram are reported to be moderately effective in deterring deer. Hinder® is made from ammonium soaps and can be applied directly to fruit and vegetable crops. It is effective up to four weeks depending on weather and application technique. Four gallons of liquid will cost about \$160 and when mixed with 100 gallons of water, will cover one acre.

Thiram, a fungicide contact repellent, is sold under several trade names including: Shotgun Rabbit-Deer Repellent®, Notts® Chew-Not, and Gustafson 42-S®, among others. One gallon of Notts® Chew-Not costs \$60 and when mixed with one gallon of water will cover about 175 square yards. Cost varies with the concentration of Thiram in the product.

Urine and manure from predators such as coyotes are also used to frighten deer from an area. Prices and quantities vary greatly for these products and success in reducing damage can be mixed. Protein-based products such as tankage (slaughterhouse by-products) may be locally available. Plantskydd® is a processed protein product that has been effective in repelling deer. A solution of 2.2 lbs mixed with two gallons of water will cover 750 conifer seedlings for about \$42.

Methionine-containing protein such as hydrolyzed casein (HC) can minimize damage to plants by making them less palatable. The HC is most successful in deterring damage when applied in an 8-12 percent concentration. One gallon of a 12 percent HC formulation costs \$23 and covers 475, 12-inch seedlings. HC can be purchased by bulk at various dairy or farm supply stores and should be mixed according to label directions to attain appropriate concentrations.



Figure 11. Tubex® tree shelter (Photo courtesy of <http://www.tubex.com>).

Frightening Devices

Deer adapt quickly to frightening devices. Research shows that propane cannons, deer guards, shell crackers, and lasers are ineffective at reducing deer damage. Moreover, audio and visual frightening devices that use noise may cause problems with neighbors in suburban areas.

Dogs can be used to frighten deer and other wildlife out of crop fields, nurseries, and orchards less than 80 acres. Dogs must be contained within areas with woven-wire fence, electric fence (6+ strand), or Invisible Fencing®. Extensive training is not required, but all dogs require regular food, water, shelter, and veterinary care. Husky and retriever mixes seem to work best for guarding areas from deer. Some individuals perform extraordinarily well and thrive on this working lifestyle, while others may not thrive outdoors or demonstrate an interest in deer. After the initial investment in fence, shelters, and dogs, the cost of maintaining and feeding a dog is about \$650 per year.

Population Reduction

Since the level of damage by deer is often linked to the number of deer in the area, population reduction is often the most effective and efficient means of preventing and controlling damage.

Fertility Control

Fertility control is a tool that may be used in the future to control herd densities in relatively small areas. Currently, antifertility agents are not available or practical for commercial use.

Capture and Remove

Deer can be captured using rocket nets, drop-door box traps, drop nets, aerial net-gunning, and chemical immobilization. Once captured, deer can be translocated or euthanized, but both are impractical, because they are time-consuming, expensive (>\$400 per deer), and seldom resolve deer damage problems. Most capture and removal of deer occurs in suburban areas involving only a few deer. Translocation of deer is prohibited under state law. Approval from the NGPC is required before any capture and removal can be initiated.

Legal Harvest

The most effective and efficient way to reduce densities of deer is to harvest deer during fall deer-hunting seasons. The regular firearm season in Nebraska lasts nine days during mid-November. The archery season starts in mid-September and runs through December, while the muzzleloader season occurs throughout the month of December. The number and availability of permits varies annually by game management unit (GMU). Resident and landowner deer permits cost \$28 and \$15, respectively, and a habitat stamp, which costs \$13, is required for most hunters.

In addition to the regular fall deer-hunting seasons, the Nebraska Game and Parks Commission also designates special seasons, bonus tags, and access to areas throughout

the state where hunters are allowed to harvest several deer in a season. These exceptions help to reduce densities of local deer populations, lessen the level of deer damage, and may lower the prevalence of diseases in deer. Current information on deer hunting in Nebraska is available online at the NGPC website (<http://www.ngpc.state.ne.us/hunting>).

Landowners can help reduce deer damage by allowing hunting on their property, especially by hunters bearing antlerless permits who are willing to shoot does. Landowners are often surprised to learn how many hunters are required to reduce populations of deer to tolerable levels, which is 25-35 deer in the agricultural areas of Nebraska. To reduce deer numbers and maintain a safe environment, landowners should allow up to two hunters per 40 acres per day throughout the hunting season.

Depredation Permits

The NGPC may issue permits to landowners to shoot deer during non-hunting periods in cases of extreme economic loss, when verified by field inspectors and all other damage control options have been considered. To receive a depredation permit, a landowner must submit a written request to their local NGPC District Office.

Toxicants

No toxicants are registered or recommended for controlling deer.

Sources of Supplies

Most nurseries, garden centers, farm supply, and hardware stores sell fencing materials and commercial repellents. In addition, information on vendors of products and services is available online through <http://icwdm.org> or by browsing the internet using keywords such as deer damage, deer fencing, deer repellents, or deer tree shelters.

Disclaimer

Reference to commercial products or trade names is made with the understanding that no discrimination is intended of those not mentioned and no endorsement by University of Nebraska–Lincoln Extension is implied for those mentioned.

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